# INSTRUCTION MANUAL

# FAIRCHILD MODEL 666 COMPRESSORS

Serial No.

FAIRCHILD RECORDING EQUIPMENT CORPORATION
10-40 45th Avenue, Long Island City 1, NY

IB666=762

# FAIRCHILD MODEL 666 COMPRESSORS

## GENERAL DESCRIPTION

The FAIRCHILD MODEL 666 is a single channel compressor incorporating a new concept in level control. The 666 design embodies the use of the FAIRCHILD compression cell before the input of the basic line amplifier section of the unit.

The compression cell is operated by a separate control amplifier. This control amplifier samples audio information and then operates the compression cell according to the threshold selected by the operator to produce desired amount of compression.

The advantages of the FAIRCHILD compression cell design are: NO DISTORTION introduced by compression; NO CHANGE IN TUBE BIAS, therefore tubes continually operate at their most desirable point; NO PHASE SHIFT due to compression. Compression takes place at the input of the system so overload of first stage is eliminated.

The 666 can be operated as a line amplifier, with or without compression, with a gain of 30 db available. The 666 has included as part of its design the AUTO-TEN, an automatic attenuator (not included in the Model 666A - the 666A is compressor-amplifier only). The use of the AUTO-TEN in the 666 is primarily to minimize "breathing" normally associated with compressors, ie., the increase of studio and amplifier noise when there is no signal present to compress. Further details on AUTO-TEN are included in section "AUTO-TEN OPERATION".

The following controls are located on the front panel:

(1) Compression Control
(2) Compression Release Control
(3) Line Amplifier Stepped Gain Control
(4) Input Level Control
(5) AUTO-TEN Threshold Control*
(6) AUTO-TEN Release Control*

(*not included in Model 666A)

The Model 666 can operate over a range of input levels from -15dbm to +5dbm. Optimum operating level is -15dbm. Higher than -15dbm levels can be accommodated by turning the input level control completely counterclockwise thereby reducing the input level 20 db (the range of this variable control).

A separate line amplifier with a stepped gain control is provided. This control is in increments of 5 db and has a range of 40 db. The gain of the line amplifier is 30 db. The setting of the line amplifier gain control is independent of the compression control setting. With line amplifier switch in POS. 10 on the stepped level control and the input level control completely open (clockwise position), the gain of the line amplifier is unity. With compression not in use, a gain of 30 or a loss of 20 db can be accommodated for a total gain variation of 50 db.

COMPRESSION OPERATION

Compression of signal in the 666 is accomplished by changing the resistance of the FAIRCHILD compression cell located at the very input of the 666. A separate compression amplifier operates this compression cell. The attack time of the compression cell is 40 milliseconds.

The signal for the compression amplifier is also picked up at the very input of the 666. A continuous compression control is employed and will produce compression ratios from 2 to 1 up to 6 to 1 in its extreme clockwise position. Curves are attached. A bias control, located internally on the left hand side of the terminal strip when front panel of unit is opened, on the compressor amplifier is preset. This bias control does not affect any tubes - it simply applies a fixed DC bias to the compression cell in order to provide smoother compression curves.

(From time to time it may be necessary to recalibrate the meter for zero adjust and this meter control, located on the underside of the front panel, should be adjusted.)

Pre-emphasized compression is also included in the unit and this is available on a switch located in the back of the unit. With the pre-emphasized compression switch in OFF position, the compression is flat.

Normally, the compression response of the 666 is flat from 20 to above 15K, so that the problem of de-essing is eliminated. However, if other than flat compression is

desirable for certain presence effects, then use the pre-emphasized compression position allowing more compression in the mid-range.

The 666 has variable compressor release time incorporated in its design. This control is located on the front panel also. Release time is variable from 300 milliseconds (.3 seconds) to 30 seconds. POS 1 (extreme counterclockwise setting) will always produce a release time of 300 milliseconds. POS. 4 will produce a release time of 30 seconds with 30 db compression; 20 seconds release time with 20 db compression and 10 seconds with 10 db of compression. Use the red dot on the control as indicator for setting up release time.

> Release time in this compressor is defined as the time needed for the gain of the compressor to return to within 1 db of its original value before compression.

The convenience of a variable release time has been included in the 666 to allow the user to set compressor and its release time to attain the best musical or dramatic effect. Release time requirements vary with material, and normally have to be set by ear rather than by arbitrary numbers.

AUTO-TEN OPERATION (not included in the Model 666A):

The 666 is also provided with an automatic attenuator circuit known as the FAIRCHILD AUTO-TEN (available separately as the Model 661). This device also works along lines similar to the compression cell of the 666. It changes resistance as indicated to the cell by a control amplifier. The control amplifier of the AUTO-TEN is transistorized. This control circuit samples the audio signal fed into the compressor, but does not ever pass any audio signal along the line to any other part of the audio circuit. Therefore, it cannot introduce distortion or noise. The AUTO-TEN will automatically attenuate when program falls below -55 dbm. It can, of course, attenuate above -55dbm and the threshold of the AUTO-TEN selects this point. Thus, the use of the AUTO-TEN makes it possible to eliminate the "breathing" effect so often encountered when compression is used. In regular compressors, the moment program disappears random noise etc. increases due to the increase in gain of the compressor amplifier. With the AUTO-TEN, this problem is eliminated.

Setting of the AUTO-TEN will vary with program material and production needs. Once triggered, the AUTO-TEN will attenu-

ate up to 60 db (a graph of AUTO-TEN action is attached). If less attenuation is desired, the following resistors should be placed across Pins 1 & 2 and 8 & 9 on socket LDA2:

| | |
|---|---|
| 6 db drop | 560 ohm |
| 10 db drop | 1.8 K |
| 20 db drop | 5.6 K |

The AUTO-TEN also has a release control which is located beneath the line level input control on the front panel. This release time control determines the amount of time needed for complete attenuating action of the AUTO-TEN. Release time is variable from .3 seconds to 7 seconds. .3 is at the extreme left counter-clockwise and 7 seconds is completely clockwise setting of the release time control. Use the red dot as an indicator for setting up release times.

ADVANTAGEOUS USES OF THE AUTO-TEN include:

1. Minimizing print-through on tapes, particularly on tapes with long pauses (such as language tapes).

2. If the 666 is used on a vocal channel, improved separation results from closedown of the channel where there is no program material.

3. Noise reduction in film recording and reproduction.

4. Minimizing studio noise during no program period in broadcasting.

CONNECTIONS

INPUT for 600 ohms: Terminals 1 & 4. Interconnect terminals 2 and 3 - also centertap.

INPUT for 150 ohms: Terminals 1 & 4. Interconnect terminals 1 and 2 and 3 and 4.

INPUT for 300 ohms: Terminals 1 and 3 or 2 and 4.

TERMINALS 5 & 6: chassis ground

OUTPUT for 600 ohms: Terminals 1 and 5. Centertap 3.

OUTPUT for 150 ohms: Terminals 2 and 4. (AUTO-TEN out of circuit*). Terminal 3 centertap.

OUTPUT for 300 ohms: Terminals 1 & 3 or 3 & 5.

(cont'd)

Connections cont'd:

(Output) TERMINAL 6 - chassis ground

* To use the AUTO-TEN with 150 ohm output, connect output wires from Terminals 2 & 4 to LDA2 connector terminals 2 & 8, previously disconnecting wires for 600 ohms circuit and pickup output at terminals 1 & 5 of output strip.

The AUTO-TEN can be disabled by turning the AUTO-TEN threshold switch all the way to the left and using the last position, which is a snap position.

NOTE: The output of the 666 COMPRESSOR has to be terminated with a resistor twice the value of the output impedance used. For example, when the 666 is used in a 600 ohm connection, terminating resistor of 1200 ohms should be connected across the output terminals. This will assure proper operation of the noise reduction circuit. The resistor would be shunted across the proper output terminals indicated above.

## CONCLUSION

Individual tastes and commercial product standards often influence the form and amount of compression desired. It is with this in mind that we have provided you with a tool flexible enough to set up to fullfil almost any requirement.

## SPECIFICATIONS

| | |
|---|---|
| LINE AMPLIFIER | Maximum gain 30 db (adjustable in 8 5db steps) |
| MAXIMUM OUTPUT | 25 dbm (13 dbm with full compression) |
| MAXIMUM COMPRESSION | 40 db (50 db change in input produces 18 db change in output) |
| FREQUENCY RESPONSE | ± 1 db - 20 to 15,000 cycles |
| FREQUENCY RESPONSE with FULL COMPRESSION | ± 1 db - 20 to 15,000 cycles |
| DISTORTION | Less than .4% with full compression from 25 to 15,000 cycles |
| NOISE LEVEL | 90 db below rated output |

(cont'd)

(Specifications cont'd)

| | |
|---|---|
| ATTACK TIME | 40 milliseconds |
| RELEASE TIME | Variable. 300 milliseconds to 30 seconds (control on front panel) |
| INPUT IMPEDANCE | 150, 300, 600 ohms, balanced or unbalanced, or from lowest to 50,000 ohms |
| OUTPUT IMPEDANCE | 150, 300, 600 ohms, balanced or unbalanced |
| TUBE COMPLEMENT | 3-2N508, 2N323, 2N307, 2N35 |
| DIODES | 6-1N96 |
| POWER CONSUMPTION | 20 watts |
| CONTROLS | Compression control, AUTO-TEN threshold setting with disable switch, amplifier gain switch (40 db range), input level control (screwdriver adjustment front panel - 20 db range), AUTO-TEN release time (screwdriver adjustment), compressor release time. |
| ADDITIONAL FEATURES | Direct meter reading in db compression; front panel on hinges - easy access to main test points; pilot light, fuse and power switch on front panel; special low hum power transformer; unique FAIRCHILD cell for compression control (plug-in, similar to tube) and cell for AUTO-TEN. |
| WEIGHT, COLOR & SIZE | 12 lbs. Black anodized panel, engraved, gray dress frame. 19"x 3½"x6" deep. |

WARRANTY

All FAIRCHILD professional products are carefully inspected and tested prior to shipment, and are guaranteed for a per-

iod of 90 days against defects in workmanship and parts. Protect your guarantee by completing and mailing the warranty registration at once. All information must be supplied in order to validate warranty.

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WARRANTY REGISTRATION

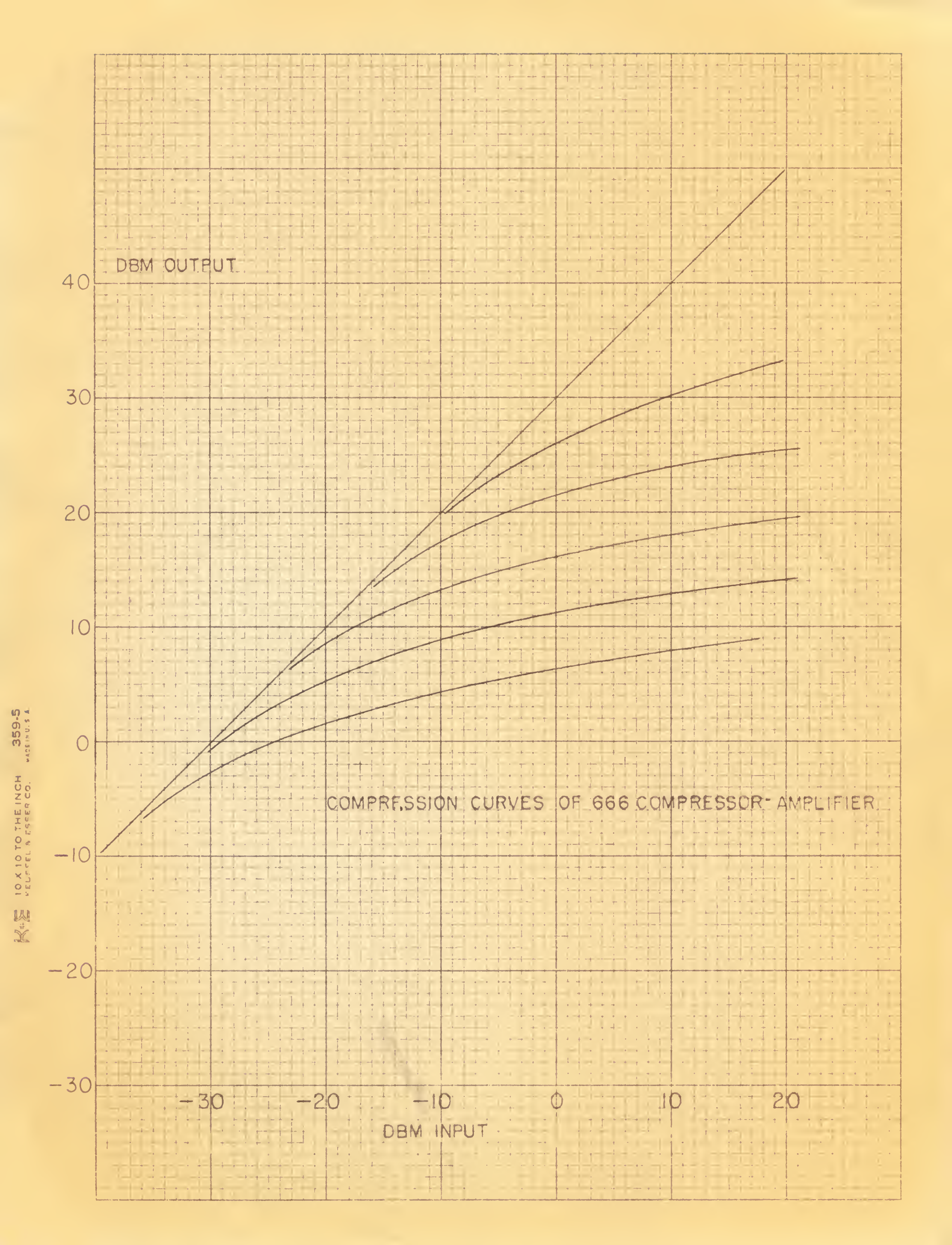
MODEL 666 COMPRESSOR Serial No.__________

Name of Purchaser______________________________ Date of Purchase:
Address______________________________ ________________
______________________________

Name of Distributor______________________________
Address______________________________

Complete and return to:
FAIRCHILD RECORDING EQUIPMENT CORP., 10-40 45 Avenue, Long Island City, NY.

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DBM OUTPUT
40
30
20
10
0
-10
-20
-30
-30
-20
-10
0
10
20
DBM INPUT
COMPRESSION CURVES OF 666 COMPRESSOR-AMPLIFIER
10 X 10 TO THE INCH
359-5

EFFECT OF THIRD HAND ON GAIN OF 666

OUTPUT OF 666 IN DBM
GAIN SET TO UNITY

-20
-30
-40
-50
-60
-70
-80
-90
-100

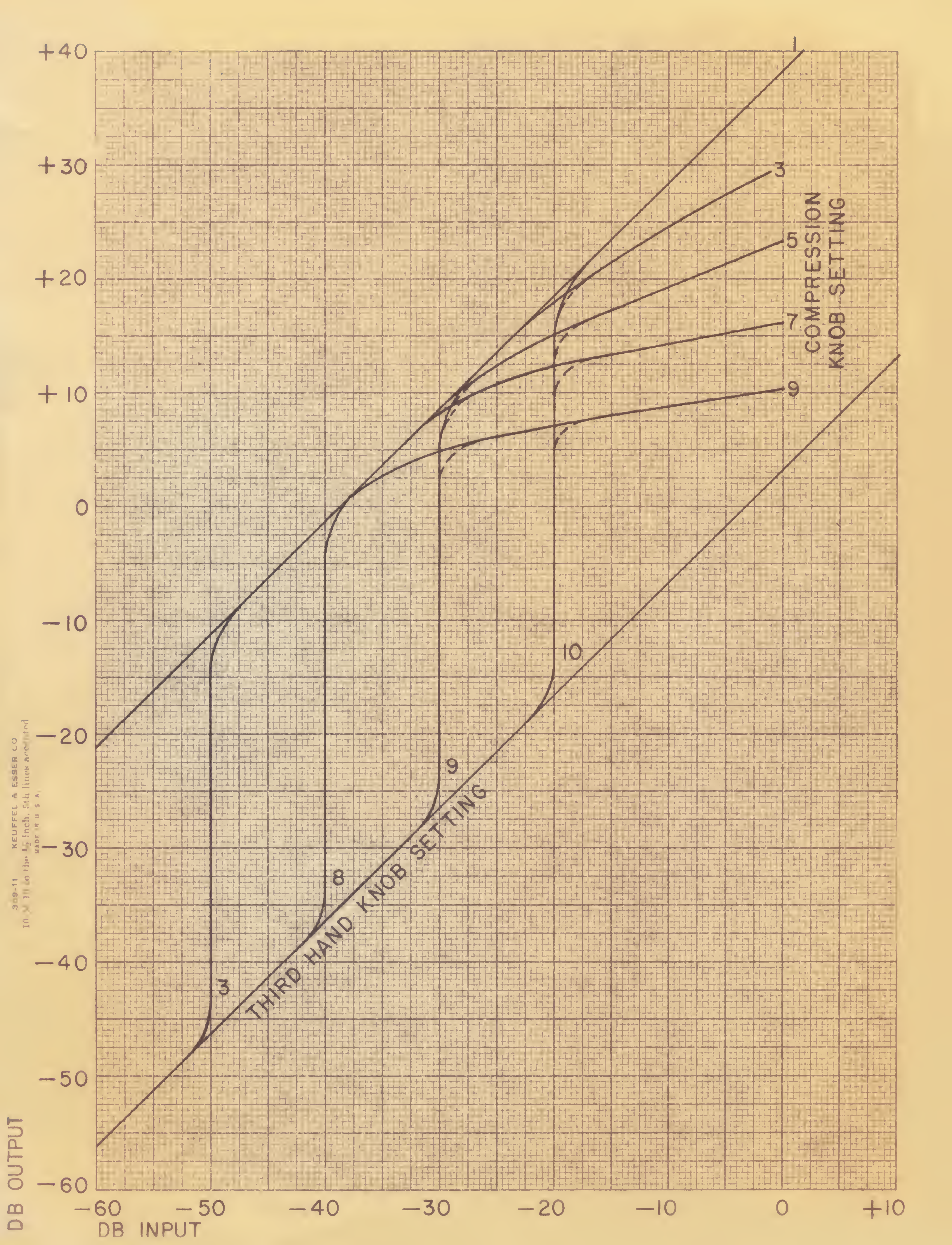
THIRD HAND OFF

LOWEST
THRESHOLD
SETTING

DBM INPUT

-70 -60 -50 -40 -30 -20

K+E 10 X 10 TO THE INCH 359-5
KEUFFEL & ESSER CO. MADE IN U.S.A.



+40
+30
+20
+10
0
−10
−20
−30
−40
−50
−60
DB OUTPUT
−60
−50
−40
−30
−20
−10
0
+10
DB INPUT
1
3
5
7
9
COMPRESSION KNOB SETTING
10
9
8
3
THIRD HAND KNOB SETTING
KEUFFEL & ESSER CO.
MADE IN U.S.A.